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RESEARCH ARTICLE

New and unpublished data about Bulgarian ground beetles from the tribes Pterostichini, Sphodrini, and Platynini (Coleoptera, Carabidae)

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Abstract

Bulgarian ground beetle (Coleoptera, Carabidae) fauna is relatively well studied but there are still many species and regions in the country which are not well researched. The present study aims at complementing the data about the distribution of the carabids from the tribes Pterostichini, Sphodrini, and Platynini, containing many diverse, interesting, and endemic species. It gives new records for 67 species and 23 zoogeographical regions in Bulgaria. The material was collected in the period from 1926 to 2021 through different sampling methods. Twenty-three species are recorded for the first time in different regions. Six species are reported for the second time in the regions where they were currently collected. Thirty-one species have not been reported for more than 20 years in Eastern and Middle Stara Planina Mts., Kraishte region, Boboshevo-Simitli valley, Sandanski-Petrich valley, Lyulin Mts., Vitosha Mts., Rila Mts., Pirin Mts., Slavyanka Mts., Thracian Lowland, and Sakar-Tundzha region. New altitude ranges are established for six of the species. The results contribute to the knowledge of the Bulgarian carabid fauna. Currently, 56 species of Pterostichini, 23 species of Sphodrini, and 36 species of Platynini are known from Bulgaria.

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Keywords
Addition, Bulgaria, carabids, distribution, Harpalinae, new records

Introduction

Ground beetles (Coleoptera, Carabidae) represent one of the largest beetle families with cosmopolitan distribution and great importance for the functioning of ecosystems. The representatives of the studied tribes Pterostichini, Sphodrini, and Platynini are very diverse. Tribe Pterostichini is one of the most species-rich groups of carabids, especially diverse in the Holarctic. Platynini is one of the largest tribes in the world fauna and is especially numerous in the tropics. Sphodrini is a smaller tribe with species distributed mainly in the Palearctic (Kryzhanovskij 1983).

In Bulgaria, most Pterostichini are non-flying zoophages, adapted to more mesophilic forest and montane conditions, and some of them are only locally spread endemics. Platynini are mostly hygrophilous intra- and extrazonal ecotone and riparian species. Unlike Sphodrini, which are adapted for survival in different ecosystems including anthropogenically modified, many Pterostichini and Platynini are stenotopic (e.g. Kryzhanovskij 1983).

Ground beetles are relatively well studied in Bulgaria, but many regions are still poorly researched, and there are still many gaps in our knowledge, especially about the endemic taxa. According to the last edition of the Palaearctic Catalogue of the Ground Beetles, currently 60 species of Pterostichini, 21 species of Sphodrini, and 35 species of Platynini are known from Bulgaria (Löbl and Löbl 2017). However, according to our own estimations (Teofilova and Guéorguiev unpublished results), these numbers are not accurate, because: *Poecilus (Ancholeus) gisellae* Csiki, 1930, *Pterostichus (Cheporus) burmeisteri* Heer, 1838, *Pt. (Cryobius) macedonicus* Apfelbeck, 1918, *Tapinopterus (Tapinopterus) bartoni* Mařan, 1933, *Calathus (Calathus) ellipticus* Reitter, 1889, and *C. (Calathus) glabricollis* Dejean, 1828 are excluded from Bulgarian fauna, but are included in the Palaearctic catalogue, as well as *Abax (Abax) parallelepipedus* (Piller et Mitterpacher, 1783) which is still doubtful for Bulgaria. Furthermore, *Pterostichus (Argutor) chamaeleon* (Motschulsky, 1866), *Laemostenus (Pristonychus) derventicus* B. V. Guéorguiev, 2003, *L. (Pristonychus) euxinicus* Nitzu, 1998, *L. (Pristonychus) stoevi* B. V. Guéorguiev, 2003, *Taphoxenus (Taphoxenus) gigas* (Fischer von Waldheim, 1823), and *Agonum (Agonum) nigrum* Dejean, 1828 are missing for Bulgaria in the Palaearctic catalogue, but they are recorded in the country. In fact, *L. derventicus* and *L. stoevi* are completely missing in the Palaearctic catalogue, probably being local endemics and thus omitted.

Therefore, the total number of species currently known in Bulgaria should be 56 species of Pterostichini, 23 species of Sphodrini, and 36 species of Platynini.

The present study aims at complementing the data about the distribution of the ground beetles from the tribes Pterostichini, Sphodrini and Platynini in Bulgaria by

adding new records for 9% of the species in Bulgarian carabid fauna, collected in 23 zoogeographical regions and subregions.

Material and methods

The majority of the material for this study came from field work carried out in different localities in Bulgaria in the period from 1926 to 2021. This material was collected through different sampling methods, such as handpicking, pan, Malaise, or pitfall trapping, and has not been published so far. All specimens are stored in the author's collection in the Institute of Biodiversity and Ecosystem Research (BAS, Sofia).

The following abbreviations of the collectors' names are used in the text: AV – A. Valkov, IG – Iliya Gyonov, IT – Ivaylo Todorov, IV – Ilko Vassilev, MN – Maria Naumova, NA – Neno Atanassov, NK – Nikolay Kodzhabashev, NS – Nikolay Simov, OT – Ognyan Todorov, PK – Plamen Kalushkov, SL – Simeon Lukanov, SS – Stefaniya Sabeva, TL – Toshko Ljubomirov, TT – Teodora Teofilova, YG – Yuli Ganev, VG – Vasil Genchev, VGu – Vyara Gusseva, VP – Vlada Peneva (Radkova), VS – Vladimir Sakalian.

The abbreviations of the zoogeographical regions are as follows: BS – Black Sea coast, DE – Eastern Danubian plain, PRM – Middle Predbalkan, PRW – Western Predbalkan, SPW – Western Stara Planina Mts., SPM – Middle Stara Planina Mts., SPE – Eastern Stara Planina Mts., SGI – Ihtimanska Sredna Gora Mts., WB – Western Bulgaria, K – Kraishte region, OP – Osogovska planina Mts., BSM – Boboshevo-Simitli valley, SPT – Sandanski-Petrich valley, L – Lyulin Mts., V – Vitosha Mts., PL – Plana Mt., R – Rila Mts., P – Pirin Mts., SL – Slavyanka Mts., T – Thracian Lowland, ST – Sakar-Tundzha region, RDW – Western Rhodope Mts., S – Strandzha Mts.

The material was determined by the author unless otherwise noted in the text. All specimens determined by others were re-examined by the author.

Results

The present study is based on various field observations and contains data about 67 Bulgarian carabid species from the tribes Pterostichini, Sphodrini and Platynini, collected in 23 zoogeographical regions and subregions in Bulgaria. Twenty-three species are recorded for the first time in different regions. Six species are reported for the second time in the regions where they were currently collected. Thirty-one species have not been reported for more than 20 years.

Species list

Harpalinae Bonelli, 1810

Pterostichini Bonelli, 1810

1. ***Abax* (*Abacopercus*) *carinatus carinatus*** (Duftschmid, 1812)

Material examined. SPM (Ribaritsa vill., 1♀3♂, 25.VII.1984, leg. IV, det. O. Kryzhanovskij); V (Dragalevtsi vill., near the cable car station, 1♀, 11.IX.1979, leg. VP, det. O. Kryzhanovskij; above Boyana vill., the road to Kopitoto, beech forest, 1♀, 16.VIII.1997, leg. IG); R (Bistritsa vill., 540 m, shaded habitat, 1♀, 12.VI.1981, leg./det. VP); RDW (Grashtitsa hamlet, 41°39'05"N, 24°37'04"E, 1340 m, 1 ex., X.2019, leg. TT).

2. *Abax* (*Abax*) *ovalis* (Duftschmid, 1812)

Material examined. SPM (S Prestoy vill., 42°50'20"N, 25°30'26"E, 709 m, 3♀, 1.VI.2012, leg. OT; S Yovovtsi village, 42°48'08"N, 25°26'36"E, 698 m, 1♂, 6.IX.2012, leg. OT); V (Bay Krastyo site, about 1400 m, 2♀2♂, 13.V.1980, leg. VP, det. O. Kryzhanovskij; near Chuypetlovo vill., about 1200 m, 1♂, 13.VIII.1983, leg. VGu, det. O. Kryzhanovskij); RDW (SE Grashtitsa hamlet, 41°38'24"N, 24°38'04"E, 1400 m, 1♂, 5.V.2018, leg. TT).

3. *Abax* (*Abax*) *parallelus parallelus* (Duftschmid, 1812)

Material examined. SPM (Ribaritsa vill., 1♂, 25.VII.1984, leg. IV, det. O. Kryzhanovskij; near Mazalat hut, 42°45'44"N, 25°08'03"E, 1412 m, 1 ex., 6.IX.2012, leg. TT&NK).

4. *Molops* (*Molops*) *dilatatus dilatatus* Chaudoir, 1868

- *Molops* (*Molops*) *dilatatus dilatatus* Chaudoir, 1868

Material examined. SPW (Tompson vill., about 500 m, 2♂, 10.VII.1981, leg. IV, det. O. Kryzhanovskij); K (Golo Bardo Mt., about 1000 m, 1♀, 6.IV.1984, leg. YG, det. O. Kryzhanovskij); V (Kopitoto Site, about 1300 m, 1♂, 2.VI.1979, 1♀, 17.V.1980, leg. VP, det. O. Kryzhanovskij); R (Parangalitsa reserve, above 1400 m, 1♀, 23.V.1982, leg. IV; Slavovo vill., 900 m, 1♀, 1.XI.1980, forest, 1♂, 29.III.1981, leg. VP, det. O. Kryzhanovskij; S Samokov, Mala Tsarkva vill., 45°15'14"N, 23°30'44" E, 1203 m, 1♀1♂, 25.VI.2020, leg. IT); RDW (NE Grashtitsa hamlet, 41°39'15"N, 24°37'24" E, 1480 m, 1 ex., 1.IV.2021, leg. TT).

- *Molops* (*Molops*) *dilatatus angulicollis* J. Müller, 1936

Material examined. S ("Strandja Geb., 3. Бурукъ", 1♂, 16.VII.1933, leg. Kr. Tuleshkov, det. O. Kryzhanovskij).

5. *Molops* (*Molops*) *doderoi hlisnikovskyi* Mlynář, 1977

Material examined. SL ("Ali Botush Geb.", 1000 m, 7.VI.1935, leg. P. Drenski, det. O. Kryzhanovskij).

6. *Molops* (*Molops*) *robustus parallelus* Mlynář, 1977

Material examined. V (near Chuypetlovo vill., about 1200 m, 1♂, 26.IV.1989, leg. NK, det. O. Kryzhanovskij; Tihiya Kat motel, about 1000 m, 1♀, 29.IV.1980, leg. VP, det. O. Kryzhanovskij).

7. *Molops* (*Molops*) *rhodopensis rhodopensis* Apfelbeck, 1904

Material examined. RDW (Srebren Peak, 1900 m, 1♂, 21.VI.1926, leg. P. Drenski, det. O. Kryzhanovskij); R (Dobro Pole vill., 1150 m, forest, 1♂, 30.IV.1981, leg. NK, det. O. Kryzhanovskij).

8. *Molops* (*Molops*) *alpestris* (Dejean, 1828)

- *Molops* (*Molops*) *alpestris centralis* Mlynář, 1977

Material examined. V ("Vitocha", 1♂, 10.X.1979, leg. IV, det. O. Kryzhanovskij).

- *Molops* (*Molops*) *alpestris kalofericus* Mlynář, 1977

Material examined. SPW (Petrohan – Kom path, 43°08'22"N, 23°06'42"E, 1530 m, ridge meadow with juniper, 1♀, 15.IV.2016, leg. TT; Berkovski Balkan Mt., 1♂, IX.2016–IV.2017, pitfall trap, leg. TT&NK).

- *Molops* (*Molops*) *alpestris rhilensis* Apfelbeck, 1904

Material examined. R (Parangalitsa reserve, above 1400 m, 1♂, 18.V.1981, 1♂, 23.V.1982, leg. IV, det. O. Kryzhanovskij; Parangalitsa reserve, 1430 m, forest, 1♂, 30.IV.1981, open habitat, 1♀, 14.VI.1981, leg. VP, det. O. Kryzhanovskij); RDW (Stoykite vill., Vodata hamlet, 41°38'56"N, 24°38'02"E, 1430 m, 1 ex., 1.IV.2021, leg. TT).

9. *Molops* (*Molops*) *rufipes* Chaudoir, 1843

- *Molops* (*Molops*) *rufipes denteletus* B.V. Guéorguiev, 1997

Material examined. OP (S Kyustendil, 42°10'30"N, 22°37'40"E, 1530 m, 1♂ 17.VI.2012, leg. TT&NK).

- *Molops* (*Molops*) *rufipes golobardensis* Mlynář, 1977

Material examined. K (Polska Skakavitsa vill., forest, 1♀, V.1984, leg. VS).

- *Molops* (*Molops*) *rufipes klisuranus* Apfelbeck, 1902

Material examined. SPM (near the town of Shipka, about 700 m, 1♂, 25.V.1998, leg. AV).

10. *Molops* (*Molops*) *piceus* (Panzer, 1793)

- *Molops* (*Molops*) *piceus bulgaricus* Mařan, 1938

Material examined. SGI (SE German vill., 42°36'03"N, 23°26'34"E, 790 m, 1♀, 2.VI.1999, leg./det. NK); V ("Bulg. Vitoscha", 800 m, 2♀, 5.X.1983, 1♂, 30.X.1983, leg. VGu, det. O. Kryzhanovskij; Dragalevtsi vill., near the cable car station, 1♀, 23.III.1980, leg. VP, det. O. Kryzhanovskij); P (near Rozhen vill., 1500 m, 1♂, 2.VIII.1982, leg. YG, det. O. Kryzhanovskij).

- *Molops* (*Molops*) *piceus byzantinus* Apfelbeck, 1902

Material examined. S (near Kosti vill., about 30 m, 29.IV.1921, leg. P. Petkoff, det. O. Kryzhanovskij).

11. *Myas* (*Myas*) *chalybeus* (Palliardi, 1825)

Material examined. SPM (S Prestoy vill., 42°50'20"N, 25°30'26"E, 709 m, 1♀1♂, 1.VI.2012, leg. OT; S Yovovtsi vill., 42°48'08"N, 25°26'36"E, 698 m, 3♀4♂, 6.IX.2012, leg. OT); SGI (SE German vill., 42°36'03"N, 23°26'34"E, 790 m, 2♀1♂, 2.VI.1999, leg./det. NK); SPT (Tisata reserve, 41°45'42"N, 23°08'58"E, 230 m, 1♀, 25.IV–7.VI.2014, leg. TT).

12. *Pedius inquinatus* (Sturm, 1824)

Material examined. BS (Ahtopol, 1♂, 8.IX.1984, leg. SS, det. O. Kryzhanovskij); L (Lyulin Mts., 1♂, 16.X.1979, leg. IV, det. O. Kryzhanovskij).

13. *Poecilus* (*Poecilus*) *anatolicus* (Chaudoir, 1850)

Material examined. SGI (SE German vill., 42°36'03"N, 23°26'34"E, 790 m, 2♀1♂, 2.VI.1999, leg. NK).

14. *Poecilus* (*Poecilus*) *cupreus cupreus* (Linnaeus, 1758)

Material examined. BS (Durankulak beach, 43°40'(40")N, 28°33'50" E, 0 m, 1♀1♂, 30.VI.2017, leg. TT); SPT (Kozhuh Mt., about 230 m, 1♂, 17.VII.1982, leg. YG, det. O. Kryzhanovskij); V ("Vitosha", 1♂, 3.IV.1982, leg. IV, det. O. Kryzhanovskij).

15. *Poecilus* (*Poecilus*) *lepidus lepidus* (Leske, 1785)

Material examined. R ("Rila planina", 1♂, 28.IV.1980, leg. IV, det. O. Kryzhanovskij; Slavovo vill., 900 m, 1♀, 1.XI.1980, open habitat, 1♀1♂, 29.III.1981, leg./det. VP; Bistritsa vill., Brakadanski bridge, 710 m, open habitat, 1♂, 29.III.1981, leg./det. VP; S Samokov, Mala Tsarkva vill., 45°15'14"N, 23°30'44"E, 1203 m, 2♀1♂, 30.VI–7.VII.2020, leg. IT); RDW (Trigrad, 1♂, 29.VII.1982, leg. IV, det. unknown).

16. *Poecilus* (*Poecilus*) *versicolor* (Sturm, 1824)

Material examined. SPW (Petrohan–Kom path, 43°08'22"N, 23°06'42"E, 1530 m, ridge meadow with juniper, 1♂, 15.IV.2016, leg. TT; Berkovski Balkan Mts., 2♂, IX.2016–IV.2017, pitfall trap, leg. TT&NK); WB (S Popovyane vill., about 930 m, 1♀, VI.2015, leg. PK); V (Kopitoto site, about 1300 m, 1♂, 29.III.1980, leg./det. VP); P (near Rozhen vill., 1500 m, 1♂, 2.VIII.1982, leg. IV, det. O. Kryzhanovskij); RDW (Chepelare, about 1230 m, 1♂, 5.VIII.1982, leg. IV, det. unknown; NW Grashtitsa hamlet, 41°39'37"N, 24°36'14"E, 1200 m, 1 ex., 20.IV.2020, leg. TT).

17. *Pterostichus* (*Adelosia*) *macer macer* (Marsham, 1802)

Material examined. BS (Ahtopol, 1♂, 8.IX.1984, leg. SS, det. O. Kryzhanovskij); L (Dragichevo vill., about 750 m, 1♀, 30.IV.1982, leg. IV, det. H. Freude).

18. *Pterostichus* (*Argutor*) *leonisi* Apfelbeck, 1904

Material examined. K (Zemen, 1♂, 5.V.1981, leg. VS (det. VS, as Pt. vernalis (Panzer, 1796) & det. NK, as ? Pt. cursor (Dejean, 1828).

19. *Pterostichus* (*Argutor*) *vernalis* (Panzer, 1796)

Material examined. V (Tihiya Kat motel, 42°38'18"N, 23°13'03"E, 1050 m, meadows, 1♂, 5.IV.1979, leg./det. VP).

20. *Pterostichus* (*Bothriopterus*) *oblongopunctatus oblongopunctatus* (Fabricius, 1787)

Material examined. SPW (N Petrohan, 43°07'57"N, 23°07'10"E, 1600 m, old beech forest, 1♂, 15.IV.2016, leg. TT); V (Knyazhevska Gora park, about 800 m, 5.IV.1979, leg. VP, 1♀, det. F. Hieke, 1♂, det. W. Heinz); R ("Rila", 1♂, 16.IV.1979, leg. IV, det. O. Kryzhanovskij); RDW (Chepelare, about 1230 m, 1♂, 5.VIII.1982, leg. IV, det. E. Kirschenhofer; NW Grashtitsa hamlet, 41°39'37"N, 24°36'14"E, 1200 m, 1♀, 18.VI.2020, leg. TT).

21. *Pterostichus* (*Feronidius*) *incommodus* Schaum, 1858

Material examined. K (Golo Bardo Mt., about 1000 m, 1♂, 5.VIII.1982, leg. NA).

22. *Pterostichus* (*Feronidius*) *melas depressus* (Dejean, 1828)

Material examined. SPM (near Cherni Osam vill., about 550 m, 1♂, 3.VIII.1984, leg. IV, det. O. Kryzhanovskij); SPW (Beledie Han hamlet, pine forest, 1♀, 7.IV.1979, leg./det.VP); V (Dragalevtsi vill., near the cable car station, 1♀, 30.IV.1979, leg./det. VP); WB (Bosnek vill., Struma river, 1♂, 1.VI.2012, leg. NS).

23. *Pterostichus* (*Petrophilus*) *melanarius* (Illiger, 1798)

Material examined. PRW (Reselets vill., about 300 m, 1♀, 15.VII.1979, 1♂, 17.VII.19781, leg. IV); SPM (Ribaritsa vill., 1♀, 25.VII.1984, leg. IV, det. O. Kryzhanovskij); V (Kopitoto site, about 1300 m, meadows, 1♂, 2.VI.1979, Tihiya Kat motel, 42°38'18"N, 23°13'03"E, 1050 m, 1♂, 29.III.1980, leg./det. VP); P (near Bansko, 1♀1♂, 18.VII.1982, leg. IV, det. F. Hieke).

24. *Pterostichus* (*Phonias*) *diligens* (Sturm, 1824)

Material examined. P ("Pirin", 1♀, 26.VII.1985, leg. IV, det. O. Kryzhanovskij); RDW (Trigrad, about 1250 m, 1♀, 29.VII.1982, leg. IV, det. E. Kirschenhofer).

25. *Pterostichus* (*Phonias*) *ovoideus ovoideus* (Sturm, 1824)

Material examined. V (Knyazhevska Gora park, about 800 m, open habitat, 1♀, 5.IV.1979, leg. VP, det. F. Hieke).

26. *Pterostichus* (*Phonias*) *strenuus* (Panzer, 1796)

Material examined. R ("Rila", 1♀, 10.X.1979, leg. IV, det. O. Kryzhanovskij; Parangalitsa reserve, above 1400 m, 1♂, 23.V.1982, leg. IV, det. F. Hieke; Bistritsa vill., 540 m, shaded habitat, 1♀, 29.V.1981, leg./det.VP; Bistritsa vill., Brakadanski bridge, 710 m, shaded habitat, 1 ex., 29.III.1981, leg./det. VP).

27. *Pterostichus* (*Platysma*) *niger niger* (Schaller, 1783)

Material examined. SPM (Ribaritsa vill., 3♂, 25.VII.1984, leg. IV, det. O. Kryzhanovskij; S Prestoy vill., 42°50'20"N, 25°30'26"E, 709 m, 1♀1♂, 1.VI.2012, leg. OT); SPW (N Petrohan, 43°08'33"N, 23°07'27"E, 1400 m, clearing, 1♀, 15.IV.2016, leg. TT); SGI (SE German vill., 42°36'03"N, 23°26'34"E, 790 m, 1♂, 2.VI.1999, leg./det. NK); V (Kopitoto site, about 1300 m, 1♂, 26.VIII.1979, leg./det. VP); R (Parangalitsa reserve, above 1400 m, 1♂, 15.X.1979, leg. IV, det. F. Hieke); P (near Rozhen vill., 1500 m, 1♀, 6.VIII.1982, leg. IV, det. O. Kryzhanovskij); RDW (Grashtitsa hamlet, 41°39'05"N, 24°37'04"E, 1340 m, 1 ex., 18.IV.2020, 1♂, 15.VI.2020, leg. TT).

28. *Pterostichus* (*Pseudomaseus*) *anthracinus anthracinus* (Illiger, 1798)

Material examined. SPT (Kozhuh Mt., about 230 m, 1♂, 3.III.1982, leg. YG, det. O. Kryzhanovskij).

29. *Pterostichus* (*Pseudomaseus*) *minor minor* (Gyllenhal, 1827)

Material examined. SPT (Kozhuh Mt., about 230 m, 1 ex., 15.V.1982, leg. YG, det. F. Hieke).

30. *Pterostichus* (*Pterostichus*) *brucki* Schaum, 1859

Material examined. V ("Vitosha", 1♂, 10.X.1979, leg. IV, det. O. Kryzhanovskij).

31. *Pterostichus* (*Pterostichus*) *merklii* (J. Frivaldszky, 1879)

Material examined. SPM (Ribaritsa vill., 3♂, 25.VII.1984, leg. IV, det. O. Kryzhanovskij, near Cherni Osam vill., about 550 m, 1 ex., 3.VIII.1984, leg. IV, det. O. Kryzhanovskij; Leshnitsa reserve, NW Yasenovo vill., 42°41'51"N, 25°13'35"E, 575 m, 1♀, 9.V–3.IX.2014, leg. TT&NK).

32. *Pterostichus* (*Pterostichus*) *rhilensis* Rottenberg, 1874

- *Pterostichus* (*Pterostichus*) *rhilensis rhilensis* Rottenberg, 1874

Material examined. R (Parangalitsa reserve, 1430 m, 1♀, 14.VI.1981, leg. VP, det. NK).

- *Pterostichus* (*Pterostichus*) *rhilensis vitosensis* Mařan, 1933

Material examined. PRW (Reselets vill., about 300 m, 1♀, 16.VII.1982, leg. IV, det. O. Kryzhanovskij); V (near Aleko hut, about 1800 m, 2♀, 23.VII.1983, leg. unknown, det. O. Kryzhanovskij).

33. *Stomis* (*Stomis*) *pumicatus pumicatus* (Panzer, 1796)

Material examined. V (Chuypetlovo vill., about 1400 m, under stone, 1♀, 1.VIII.1983, leg. VGu, det. O. Kryzhanovskij); R (Parangalitsa reserve, above 1400 m, 1♀, 30.IV.1981, leg./det. VP).

34. *Tapinopterus* (*Tapinopterus*) *balcanicus* Ganglbauer, 1891

- *Tapinopterus* (*Tapinopterus*) *balcanicus balcanicus* Ganglbauer, 1891

Material examined. SPW (Tompson vill., about 500 m, 1♀, 10.VII.1981, leg. IV); V (Cherni Vrah Peak, 2290 m, 1♀, 26.VI.1983, leg. unknown, det. O. Kryzhanovskij); R (Parangalitsa reserve, above 1400 m, 1♀, 23.V.1982, leg. IV, det. H. Freude; Parangalitsa reserve, 1430 m, forest, 1♀, 17.IX.1981, leg./det. VP; Slavovo vill., 900 m, near river, forest, 1♀1♂, 14.X.1981, leg./det. VP); P (near Rozhen vill., 1500 m, 1♂, 6.VIII.1982, leg. YG, det. E. Kirschenhofer); RDW (Pamporovo resort, about 1600 m, 2♂, 4.VIII.1981, leg. IV, det. unknown).

- *Tapinopterus* (*Tapinopterus*) *balcanicus belasicensis* Mařan, 1933

Material examined. OP (SW Kyustendil, 42°11'01"N, 22°38'01"E, 1394 m, 1♀, 17.VI.2012, leg. TT&NK).

35. *Tapinopterus* (*Tapinopterus*) *cognatus kalofirensis* Mařan, 1933

Material examined. V (Dragalevtsi vill., near the cable car station, 1♂, 30.IV.1980, leg. VP, det. O. Kryzhanovskij); PL (Planshtitsa river, 42°33'15"N, 23°27'81"E, 724 m, 1♂, 24.V.2012, leg. MN).

36. *Xenion ignitum* (Kraatz, 1875)

Material examined. SGI (SE German vill., 42°36'03"N, 23°26'34"E, 790 m, 1♀, 2.VI.1999, leg./det. NK); V (Bay Krastyo site, about 1400 m, 2♂, 28.IV.1980, leg. VP, det. O. Kryzhanovskij); R (Parangalitsa reserve, above 1400 m, 1♂, 23.V.1982, leg. IV, det. W. Heinz); SL (near Livade vill., 41°24'39"N, 23°36'08"E, 1229 m, 1♂, 19.VI.2020, leg. MN).

Sphodrini Laporte, 1834

37. *Platyderus* (*Platyderus*) *rufus rufus* (Duftschmid, 1812)

Material examined. SPW (Beledie Han hamlet, bushes, 1♀, 7.IV.1979, leg. VP, det. F. Hieke).

38. *Calathus* (*Calathus*) *distinguendus* Chaudoir, 1846

Material examined. RDW (Besaparski Ridove Hills, S Sinitovo vill., 42°07'39"N, 24°22'38"E, 322 m, 1♀, 28.IV–29.V.2020, 1♀, 29.V–22.VI.2020, leg. TL); S (W Malko Tarnovo, 41°58'19"N, 27°30'33"E, 487 m, 1♀, 26.IX.2014, leg. SL, det. B. Guéorguiev).

39. *Calathus* (*Calathus*) *fuscipes* (Goeze, 1777)

Material examined. BS (Krapets-Durankulak beach, 43°40'40"N, 28°33'50"E, 0 m, 1♀, 30.VI.2017, leg. TT; SW Balchik, 43°23'49"N, 28°06'06"E, 218 m, 1♂2♀, 11–12.X.2018, pan traps, 43°23'40"N, 28°06'34"E, 210 m, 1♂, 2.IX–11.X.2018, 1♀, 2.IX–11.X.2018, 43°23'49"N, 28°06'20"E, 217 m, 2♀, 17.IV–10.V.2018, 1♀2♂, 19.VIII–18.IX.2018, 10♀11♂, 20.IX–11.X.2018, 43°23'49"N, 28°06'06"E, 218 m,

1♀, 10.V–11.VI.2018, 1♂, 12.VI–25.VII.2018, 1♀1♂, 17.IV–10.V.2018, pitfall traps, leg. TL); DE (Srebarna lake, 1♂, 1989, leg./det. NK); BSM (Selishte vill., 1♀, 14.IX.1978, leg. IV; Blagoevgrad, about 515 m, 1♂, 14.V.1980, leg. IV, det. O. Kryzhanovskij); SPT (Kozhuh Mt., about 230 m, 1♀1♂, 20.X.1985, leg. YG, det. F. Hieke); L (ridge above Vladaya vill., 1♂, 24.III.1979, leg./det. VP); V (N Bistritsa, 42°36'51"N, 23°21'35"E, 740 m, 1♀2♂, 17.V–29.V.2019, leg. IT); P (near Bansko, about 900 m, 1♀1♂, 18.VII.1982, leg. IV, det. unknown; near Rozhen vill., 1500 m, 1♀, 6.VIII.1982, leg. YG, det. O. Kryzhanovskij); T (Yagodovo vill., 42°06'38"N, 24°51'04"E, 159 m, house yard, 1♀, 18.V.2020, leg. VG).

40. *Calathus* (*Neocalathus*) *ambiguus ambiguus* (Paykull, 1790)

Material examined. BS (SW Balchik, 43°23'40"N, 28°06'34"E, 210 m, 1♀, 19.VIII–18.IX.2018, 1♂, 2.IX–11.X.2018, pitfall traps, leg. TL); BSM (Selishte vill., about 515 m, 1♀1♂, 24.VIII.1980, leg. IV, det. F. Hieke); SPT (Tisata Reserve, 41°43'31"N, 23°08'53"E, 230 m, 1♀, 25.IV.2014, leg. TT); S (Voden vill., 500 m, 1 ex., 23.VI.1976, leg. IV).

41. *Calathus* (*Neocalathus*) *cinctus* Motschulsky, 1850

Material examined. BS (SW Balchik, 43°23'49"N, 28°06'52"E, 193 m, 1♂, 19–20.IX.2018, pan trap, 43°23'40"N, 28°06'34"E, 210 m, 1♀1♂, 2.IX–11.X.2018, 43°23'49"N, 28°06'20"E, 217 m, 1♀1♂, 20.IX–11.X.2018, pitfall traps, leg. TL); DE (Srebarna Lake, 2♂, 11.IX.1989, leg./det. NK; SE Petleshkovo vill., 43°38'43"N, 28°02'08"E, 230 m, 1♂, 1.X.2016, leg. TL).

42. *Calathus* (*Neocalathus*) *erratus erratus* C.R. Sahlberg, 1827

Material examined. R ("Rila planina", 1♀, 28.IV.1980, leg. IV, det. O. Kryzhanovskij); P (near Rozhen vill., 1500 m, 1♂, 6.VIII.1982, leg. YG, det. H. Freude).

43. *Calathus* (*Neocalathus*) *melanocephalus melanocephalus* (Linnaeus, 1758)

Material examined. SPW (Petrohan–Kom path, 43°08'22"N, 23°06'42"E, 1530 m, ridge meadow with juniper, 3♀2♂, VII–X.2017, pitfall traps, leg. TT&NK).

44. *Calathus* (*Neocalathus*) *metallicus* Dejean, 1828

Material examined. SPW (Tompson vill., about 500 m, 1♀, 10.VII.1981, leg. IV, det. unknown; Gorna Koriya reserve, 43°10'55"N, 23°04'25"E, 1680 m, spruce forest, 3♀4♂, 16.IV.2016, leg. TT&NK; Berkovski Balkan Mt., 1♂, IX.2016–IV.2017, pitfall trap, leg. TT&NK); R (Parangalitsa reserve, above 1430 m, 1♂, 18.V.1981, 2♂, 23.V.1982, leg. IV, det. W. Heinz); RDW (Pamporovo resort, about 1600 m, 1♀, 4.VIII.1981, leg. IV, det. unknown).

45. *Calathus* (*Neocalathus*) *mollis mollis* (Marsham, 1802)

Material examined. SPT (Kozhuh Mt., about 230 m, 1 ex., 2.III.1982, leg. YG, det. F. Hieke).

46. *Dolichus halensis* (Schaller, 1783)

Material examined. BS (Veteran hut near Varna, 9 m, 1♀, 15.VIII.1982, leg. YG); T (Rakovski, 42°16'55"N, 24°57'20"E, 180 m, 1 ex., 8.VII.2019, leg. TT).

47. *Laemostenus* (*Actenipus*) *plasoni plasoni* (Reitter, 1885)

Material examined. SL (road to Livade vill., 41°24'39"N, 23°36'08"E, 1229 m, 2♂, 19.VI.2020, leg. MN); RDW (Besaparski Ridove hills, S Sinitovo vill., 42°07'28"N, 24°22'26"E, 271 m, 1♀, 29.V–22.VI.2020, leg. TL).

48. *Laemostenus* (*Pristonychus*) *cimmerius* (Fischer von Waldheim, 1823)

Material examined. PRM (Devetashka cave, 43°14'01"N, 24°53'08"E, about 130 m, 1♀, 30.VII.1998, leg. NS); ST (Sakar Mt., Dervishka Mogila peak, 41°54'50"N, 26°21'01"E, 670 m, 1♂, 30.V.2020, leg. MN); RDW (NE Grashtitsa hamlet, 41°39'15"N, 24°37'25"E, 1483 m, 1♀, 19.VII.2020, leg. TT).

49. *Laemostenus* (*Pristonychus*) *terricola punctatus* (Dejean, 1828)

Material examined. SGI (SE German vill., 42°36'03"N, 23°26'34"E, 790 m, 3♀, 2.VI.1999, leg./det. NK); V ("Vitoscha", 1200 m, 1♀, 30.IX.1984, leg. SS, det. O. Kryzhanovskij); R ("Rila", 1♀, 20.VIII.1979, leg. IV, det. T. Vereschagina); ST (Sakar Mt., Dervishka Mogila peak, 41°54'50"N, 26°21'01"E, 670 m, 1♀, 30.V.2020, leg. MN).

50. *Synuchus* (*Synuchus*) *vivalis vivalis* (Illiger, 1798)

Material examined. K (Razhdavitsa vill., meadow, about 500 m, 2 ex., X.1984, leg./det. VS); V (Tihiya Kat motel, 42°38'18"N, 23°13'03"E, 1050 m, 1♀, 24.VI,1979, leg./det. VP); R (Dobro Pole vill., 1150 m, shaded habitat 1♂, 13.VII.1981, leg./det. VP); RDW (Chepelare, about 1230 m, 1♀, 5.VIII.1982, leg. IV, det. F. Hieke).

Platynini Bonelli, 1810

51. *Agonum* (*Agonum*) *antennarium* (Duftschmid, 1812)

Material examined. V (Tihiya Kat motel, lawns, 42°38'18"N, 23°13'03"E, 1050 m, 1♂, 5.IV.1979, leg./det. VP); R (Parangalitsa reserve, above 1430 m, 2 ex., 15.X.1979, "Rila planina", 1♂, 10.X.1979, leg. IV).

52. *Agonum* (*Agonum*) *marginatum* (Linnaeus, 1758)

Material examined. P (Bansko, 1♂, 10.VII.1982, leg. SS, det. NK).

53. *Agonum* (*Agonum*) *muelleri* (Herbst, 1784)

Material examined. PRW (Hubavene vill., about 300 m, 1♂, 16.V.1981, leg. IV, det. O. Kryzhanovskij); RDW (Chepelare, about 1230 m, 2♂, 5.VIII.1982, leg. IV, det. F. Hieke & E. Kirschenhofer).

54. *Agonum* (*Europhilus*) *gracile* Sturm, 1824

Material examined. V ("Vitoscha", 1♂, 10.X.1979, leg. IV, det. O. Kryzhanovskij).

55. *Agonum* (*Europhilus*) *micans* (Nicolai, 1822)

Material examined. PRW (Hubavene vill., about 300 m, 1♀, 16.V.1981, leg. IV, det. H. Freude).

56. *Agonum* (*Olisares*) *angustatum* Dejean, 1828

Material examined. PRW (Hubavene vill., about 300 m, 1 ex., 16.V.1981, leg. IV, det. E. Kirschenhofer).

57. *Agonum* (*Olisares*) *sexpunctatum* (Linnaeus, 1758)

Material examined. R (Parangalitsa reserve, above 1400 m, 1♀, 16.X.1979, leg. IV, det. E. Kirschenhofer; Slavovo vill., 900 m, 1♀, 1.XI.1980, 1♀, 14.X.1981, leg./det. VP).

58. *Agonum* (*Olisares*) *viduum* (Panzer, 1796)

Material examined. SPT (Kozhuh Mt., about 230 m, 1♂, 14.VIII.1982, leg. YG, det. H. Freude); RDW (Chepelare, about 1230 m, 1♂, 5.VIII.1982, leg. IV, det. NK).

59. *Agonum* (*Olisares*) *viridicupreum viridicupreum* (Goeze, 1777)

Material examined. SPT (Kozhuh Mt., about 230 m, 1♂, 2.III.1982, leg. YG, det. unknown); L (Lyulin Mts., 1♀, 16.X.1979, leg. IV, det. NK); V ("Vitosha", 1♀, 3.IV.1982, leg. IV, det. O. Kryzhanovskij).

60. *Agonum* (*Platynomicrus*) *gracilipes* (Duftschmid, 1812)

Material examined. PRW (Reselets vill., about 300 m, 1♀, 10.VII.1978, leg. IV, det. F. Hieke).

61. *Anchomenus* (*Anchomenus*) *dorsalis* (Pontoppidan, 1763)

Material examined. DE (SE Petleshkovo vill., 43°38'43"N, 28°02'08"E, 230 m, 1♂, 1.X.2016, leg. TL); SGI (SE German vill., 42°36'03"N, 23°26'34"E, 790 m, 1♂, 2.VI.1999, leg./det. NK); WB (S Popovyane vill., 930 m, 1♀, VI.2015, leg. PK); V (Kopitoto site, 1340 m, 1♂, 29.III.1980, leg. VP, det. F. Hieke); T (Yagodovo vill., 42°06'38"N, 24°51'04"E, 159 m, house yard, 1♂, 11–20.VI.2020, 1♂, 25–31.VII.2020, leg. VG).

62. *Limodromus assimilis* (Paykull, 1790)

Material examined. SPE (Sedlarevo vill., 42°41'22"N, 26°34'53"E, 460 m, 1♀, 4.V.1980, leg. IV, det. F. Hieke); SPM (S Prestoy vill., 42°50'20"N, 25°30'26"E, 709 m, 1♀1♂, 1.VI.2012, leg. OT; S Yovovtsi vill., 42°48'08"N, 25°26'36"E, 698 m, 2♀2♂, 6.IX.2012, leg. OT); SPW (SW Berkovitsa, 43°13'04"N, 23°06'11"E, 623 m, Berkovs-

ka river, 1♀, 16.IV.2016, leg. TT; SE Berkovitsa, NE Klisurski Monastery, 43°11'55" N, 23°12'47" E, 525 m, oak forest, 1♂, 15.VII.2017, leg. TT); V (Dragalevtsi vill., near the cable car station, 1♂, 23.III.1980, 2♀, 15.IV.1980, 1♂, 13.V.1980, leg./det. VP); R (Bistritsa vill., 540 m, near river, 1♂, 1.V.1981, leg./det. VP).

63. *Olisthopus fuscatus* Dejean, 1828

Material examined. SPT (Kozhuh Mt., about 230 m, 1♀, 20.X.1985, leg. YG).

64. *Olisthopus glabricollis* (Germar, 1817)

Material examined. BSM (Selishte vill., 1♂, 14.IX.1978, leg. IV).

65. *Olisthopus sturmi* (Duftschmid, 1812)

Material examined. V ("Vitoscha", 1 ex., 10.X.1979, leg. IV, det. O. Kryzhanovskij).

66. *Paranchus albipes* (Fabricius, 1796)

Material examined. SPM (Ribaritsa vill., 1 ex., 25.VII.1984, leg. IV, det. O. Kryzhanovskij); SPT (Kozhuh Mt., about 230 m, 1♀, 14.VII.1982, leg. YG, det. F. Hieke); R (Bistritsa vill., 550 m, 2♀, 8.XI.1980, leg. VP, det. O. Kryzhanovskij; Bistritsa vill., 540 m, near river, 1♀, 14.V.1981, leg./det. VP).

67. *Platynus scrobiculatus* (Fabricius, 1801)

- *Platynus scrobiculatus purkynei* Obenberger, 1917

Material examined. RDW (Chepelare, about 1230 m, 1♀1♂, 5.VIII.1982, leg. IV, det. O. Kryzhanovskij).

- *Platynus scrobiculatus serbicus* Csiki, 1904

Material examined. V (Tihiya Kat motel, 42°38'18"N, 23°13'03"E, 1050 m, 1♀, 29.IV,1980, leg. VP, det. W. Heintz; Dragalevtsi vill., near the cable car station, 1♀, 9.X.1979, leg. VP, det. O. Kryzhanovskij; "Vitoscha", 1♂, 19.IX.1980, leg. IV).

Discussion

Twenty-three of the presented species are recorded for the first time in different regions in Bulgaria (Figure 1). *Laemostenus cimmerius* is new to the Middle Predbalkan, *Agonum angustatum*, *A. gracilipes*, *A. muelleri* and *Pterostichus rhilensis* are new to the Western Predbalkan, and *A. muelleri* and *Pt. rhilensis* are also new to the whole Predbalkan region. *Molops dilatatus* and *Tapinopterus balcanicus* are new to the Western Stara Planina Mts. *Anchomenus dorsalis*, *Myas chalybeus* and *Poecilus anatolicus* are new to the Ihtimanska Sredna Gora Mts., the last being also new to the whole Sredna Gora Mts. *Molops dilatatus* and *Pterostichus leonisi* are here reported for the first time from the Kraishte region; *Calathus ambiguus* and *Olisthopus glabricollis* – for the Boboshevo-Simitli valley; *Agonum gracile* – for the Vitosha

Mts.; *Agonum viridicupreum* – for the Lyulin Mts.; *Stomis pumicatus* – for the Rila Mts.; *Laemostenus plasoni* – for the Slavyanka Mts. Four species are new to the Pirin Mts.: *Agonum marginatum*, *Molops piceus*, *Poecilus versicolor* and *Pterostichus melanarius*. Three species are new to the Sandanski-Petrich valley: *Agonum viduum*, *Olisthopus fuscatus* and *Pterostichus minor*. In fact, this is the second region in Bulgaria where *O. fuscatus* is to be found after the Black Sea coast (Hieke and Wrase 1988; Wrase 1991; Guéorguiev and Guéorguiev 1995a; Teofilova et al. 2012; Kostova and Guéorguiev 2016; Kryzhanovskij unpublished results).

Six species are reported for the second time in the regions where they were currently collected. *Agonum micans* is reported for the first time in the Western Predbalkan, since Vasilev and Necheva (1985). *Pterostichus melanarius* is reported for the same subregion only by Yoakimov (1904) and for the whole Predbalkan region by Guéorguiev and Guéorguiev (1995a), probably based on the same record. This is also the second record of *Synuchus vivalis* for the Kraishte region (after Sakalian and Guéorguiev 1995), *Tapinopterus balcanicus* for the Osogovska planina Mts. (after Guéorguiev 1999), and *Calathus distinguendus* for the Strandzha Mts. (after Kostova and Guéorguiev 2016). *Agonum viridicupreum* is reported only by Guéorguiev and Guéorguiev (1995a) for the Vitosha Mts.

Thirty-one species have not been recorded in Bulgaria for more than 20 years. *Limodromus assimilis* have not been reported from the Eastern Stara Planina Mts. since Hieke and Wrase (1988) and from the Rila Mts., since Guéorguiev and Guéorguiev (1995a). The last record of *Calathus metallicus* for the Western Stara Planina Mts. is that of Guéorguiev et al. (1997). *Poecilus cupreus* hasn't been reported from the Sandanski-Petrich valley and Vitosha Mts. since 1995 (Guéorguiev and Guéorguiev 1995a, and Guéorguiev and Guéorguiev 1995b, respectively).

Guéorguiev and Guéorguiev (1995a) are the last who recorded: *Paranchus albipes* for the Middle Stara Planina Mts., Sandanski-Petrich valley and the Rila Mts.; *Agonum antennarium* for the Rila and Vitosha Mts.; *Calathus erratus* for the Rila and Pirin Mts.; *Calathus fuscipes* for the Boboshevo-Simitli valley and Pirin Mts.; *Laemostenus terricola* for the Rila Mts. and Sakar-Tundzha region; *Abax ovalis* and *Pterostichus melas* for the Middle Stara Planina Mts.; *Pterostichus incommodus* for the Kraishte region; *Agonum viridicupreum*, *Calathus ambiguus*, *C. mollis*, and *Pterostichus anthracinus* for the Sandanski-Petrich valley; *Pedius inquinatus* for the Lyulin Mts.; *Olisthopus sturmii*, *Pterostichus vernalis*, and *Pterostichus ovoideus* for the Vitosha Mts.; *Abax carinatus*, *Agonum sexpunctatum*, *Pterostichus oblongopunctatus*, *Pterostichus strenuus*, and *Synuchus vivalis* for the Rila Mts.; *Pterostichus diligens* and *Pterostichus niger* for the Pirin Mts.; *Dolichus halensis* for the Thracian Lowland.

Same year, *Poecilus versicolor* is recorded for the last time in the Vitosha Mts. (Krusteva et al. 1995). Two years later, *Calathus metallicus* and *Pterostichus rhilensis rhilensis* were reported for the Rila Mts., and *Xenion ignitum* was reported for the last time for the Slavyanka Mts. (Guéorguiev et al. 1997). In 1998, *Pterostichus melanarius* and *Pterostichus rhilensis vitosensis* were noted for the last time for the Vitosha Mts. (Guéorguiev et al. 1998).

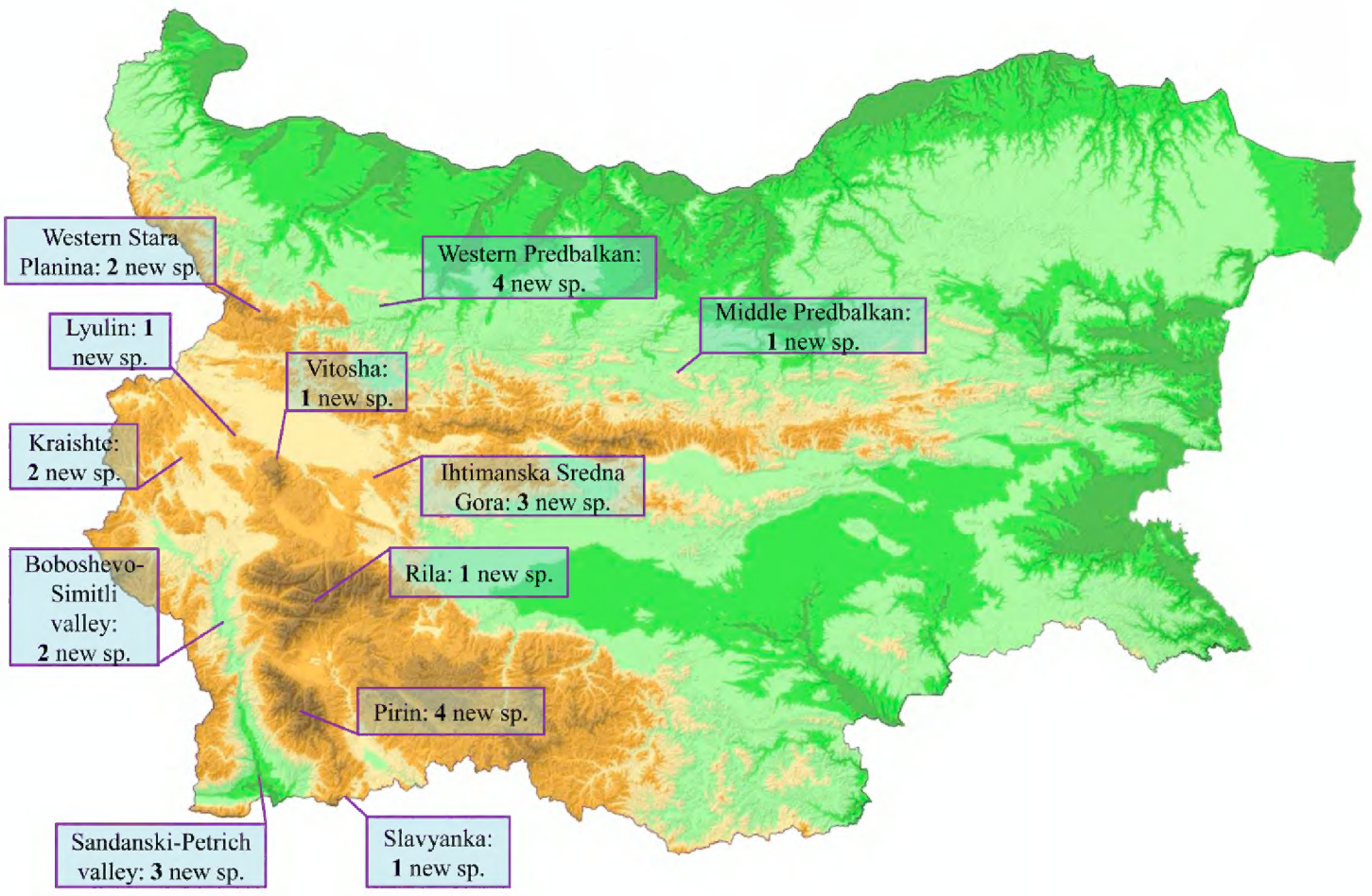
Western Stara Planina: 2 new sp.
Western Predbalkan: 4 new sp.
Middle Predbalkan: 1 new sp.
Lyulin: 1 new sp.
Vitosha: 1 new sp.
Kraishte: 2 new sp.
Ihtimanska Sredna Gora: 3 new sp.
Boboshevo-Simitli valley: 2 new sp.
Rila: 1 new sp.
Pirin: 4 new sp.
Sandanski-Petrich valley: 3 new sp.
Slavyanka: 1 new sp.

Figure 1. Map of the regions where new carabids are recorded, with a number of the newly established species

Very interesting is the finding of *Pterostichus rhilensis* in the Predbalkan region, at about 300 m a.s.l. The species is a Bulgarian montane endemic and, so far, it has been collected on altitudes of above 1000 m. The subspecies *rhilensis vitosensis* is known from the Middle Stara Planina and Vitosha Mts. The other two subspecies *rhilensis rhilensis* Rottenberg, 1874 and *rhilensis kourili* Mařan, 1933, are distributed in Southern Bulgarian mountains. The real relevance of these forms is not entirely clear, as is the question of the biogeographical variability of the species, as it has also been stated by the late Prof. O. L. Kryzhanovskij (Kryzhanovskij unpublished results). It is possible that the material from the Predbalkan region has to be attributed to different subspecies. That should be proved by collecting and analyzing additional and more recent material.

New altitude ranges are found for another five species, but those were expanding upwards. *Poecilus anatolicus* is reported here from an altitude of 790 m in Sredna Gora Mts. while it was so far known from up to 430 m in the Eastern Rhodope Mts. (Teofilova and Kodzhabashev 2020). *Olisthopus fuscatus* was so far known only from the Black Sea coast up to 50 m (Hieke and Wrase 1988; Wrase 1991; Guéorguiev and Guéorguiev 1995a; Teofilova et al. 2012, Kostova and Guéorguiev 2016; Kryzhanovskij unpublished results); it is recorded here from 230 m in the Sandanski-Petrich valley. The range of *Agonum micans* lifted in height with only 50 m, to 300 m, as it was pre-

viously known from 250 m in the same zoogeographic region (Vasilev and Necheva 1985; Guéorguiev and Guéorguiev 1995a). *Pterostichus macer* is recorded here from 750 m in the Lyulin Mts., as it was previously known up to 600 m (Guéorguiev and Guéorguiev 1995a). *Molops robustus parallelus* was previously known from up to 1000 m (Guéorguiev and Guéorguiev 1995a), and here is reported from 1200 m in the Vitosha Mts. Since most of the material is relatively old, it would be speculative to predict if these new findings concern global environmental changes and reflect the respective responses of the animals, but such trends have been previously reported in Bulgaria (Teofilova 2017).

Conclusion

The present study provides some novelty about the carabid fauna of Bulgaria and more precisely for the tribes Pterostichini, Sphodrini and Platynini, containing many diverse, interesting and endemic species. Although the ground beetle fauna of Bulgaria is relatively well studied, there are still some regions representing "white spots" regarding the knowledge of their carabid species composition and community structure (different parts of the Danubian Plain and Stara Planina Mts., Predbalkan and Podbalkan regions, Sakar Mts., some mountains near Sofia, Mesta river valley). A more complete knowledge of the diversity of the carabids in the country could be revealed only after carrying out further studies in these poorly-examined regions.

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